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THE NEWSPAPER FOR
THE HOBBYIST OF VINTAGE
ELECTRONICS AND SOUND

THE HORN SPEAKER

Horn Contour

AN INTERVIEW

WITH

P.G.A.H. VOIGT

by Bruce C. Edgar

Member of the Technical Staff
Particles and Fields Department
Space Sciences Laboratory

Background

In April 1980 I sent a letter to P.G.A.H. Voigt, a British audio pioneer, about details on his tractrix horns. His name had come up in a conversation I had with Ed Dell about horn loudspeakers. Ed kindly supplied his address in Canada. I heard nothing for several months until August when a letter from Voigt's wife arrived. Since the letter covered none of my questions, I gave him a long distance call which turned out to be the start of many letter and telephone exchanges. Ed Dell and I approached Voigt about doing an interview for Speaker Builder. Voigt at first refused because he said that he had too many projects and immediate worries that had to be dealt with. Then as our letter and telephone conversations progressed, he gradually relented and told me that we could do the interview in January, 1981.

However, over Christmas Voigt developed a painful hernia which would require surgery and put off any interview. But during January, since he was confined to sitting position to lessen the pain, he typed several long letters on many speaker subjects which I had been asking about. Voigt went into surgery on February 3, 1981 and came home on February 8, to recuperate after an apparently successful operation. But on February 9, Voigt suffered a heart attack and died suddenly at the age of 79.

Mrs. Voigt sent me a package of all the letters that he had been working on. The length and breadth of the material indicates to me that Voigt knew that his time was running out and this was the time "to set the record straight". It is from these letters and other sources that I have edited to give the interview that Voigt in person never gave us.

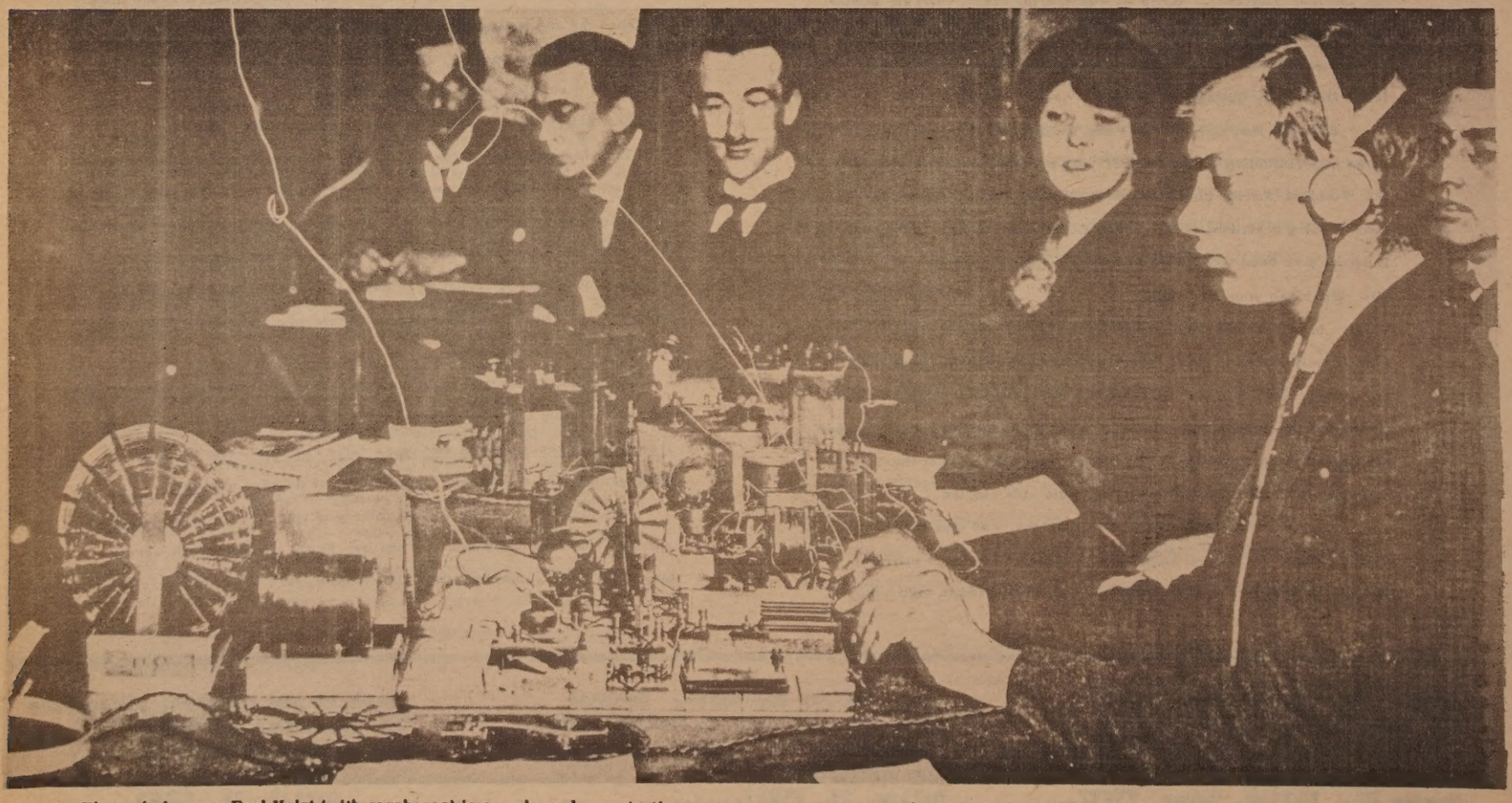

Figure 1 A young Paul Voigt (with earphones) is seen here demonstrating a reflex (dual high and low frequency) amplifier circuit for the "Wireless and Experimental Association" of Peckham in 1922.

Introduction

Paul Gustavus Adolphus Helmuth Voigt was born on December 9, 1901 in London, England. His parents were originally from Germany who immigrated to England in the late 1800's and became naturalized English citizens. His father was an importer of buckram material which was used in ladies' hats. According to Ida Voigt, Paul Voigt's wife, his mother had the "real brains of the family", and was a constant source of encouragement. Voigt's mother lived to be 103, and Voigt expected to follow her example.

Paul Voigt came from an age of gentlemen which will never be seen again. His approach to loudspeaker design was to use intuitive physical reasoning which apparently was the style of many researchers of the early 1900's. He was also a loner, though he had many friends, who persisted towards a goal of audio perfection in the face of contrary contemporary thought and wisdom. Peter Baxandall said of Voigt (TAA 4/79), "He was a splendid chap...He demonsfrated his corner loudspeaker. I heard that evening a standard of music reproduction I'd never heard before". He was a hero to many British audiophiles of the first half of this century but a relative unknown in the U.S. I hope this interview will correct the latter situation.

Paul Voigt was an audio "systems" engineer before the term was invented. He developed and/or invented velocity and capacitor microphones, amplifiers, transformers, moving coil cutters and pickups, and horn loudspeakers, all for the quality reproduction of sound. At the end of his career, he held 32 patents. In many areas he was ahead of his time, and by the time the world caught up with him, his contributions were either ignored or forgotten. So as you read this interview, see how many modern concepts and ideas of hifi had precursers in Voigt's work.

SB: What was the nature of your education?

Voigt: I was born on the 9th Dec 1901. I was a "born" inventor and, for that reason wanted to learn engineering. My parents could afford to send me to Dulwich College, 2 miles from home (in London, England). It had an engineering side. And so, during the first world war, from the age of 13, I was learning the basics of engineering. In 1922, I graduated in Electrical Engineering from University College, London.

By then, that war was over and radio was permitted again. I was experimenting on the subject, and my first article appeared in the Wireless World, publishing date 10th Dec 1921, i.e. before I ceased being a student at University College or having any degree. It would have been written while I was 19. (See Figure 1).

SB: What was your first job?

Voigt: My first paid employment was at J. E. Hough, Ltd., Edison Bell works in 1922, where gramophone records were made and plastic mouldings for the radio and other trades. The firm was afraid that the advent of the B.B.C. would damage the record market and caused them (sensibly) to decide to enter that market themselves. I was one of those taken on to get the radio side started.

However, knowing that I was an inventor and that there was no way, ahead of time, of knowing how valuable my ideas might be, (and that it was normal for employees to be obligated to sign away their patent rights), I insisted that that not be the case with me, that my patents remain my property, (I to pay the costs of patenting) and that THEY HAD PREFERENTIAL RIGHTS AS REGARDS LICENSING.

There never was a better incentive to invent things of direct use to the company.

Apart from my work designing radios and test gear etc., by late 1926, I had developed the first British designed electric recording system to last for years under practical working conditions. Our competitors were ahead of us, but only because they were using U.S. designed equipment, and since I used a moving coil cutter I had designed, my records did not have the hysteresis distortion natural to moving iron devices.

I had not been there for long before I realized that if the artists and musicians played and sang into a mike (a la B.B.C.) whose output was amplified and fed into some kind of electric cutter, that a better master should result than from the use of an assortment of large trumpets. I was encouraged. And before the end of 1926, my system (which used a moving coil cutter) was in commercial use and, with minor improvements, remained in use until Edison Bell, Ltd. (the later name of the Company) died in the slump (April, 1933).

SB: Describe your early experiments with microphones.

VOIGT: Although my initial function was to develope radio components and sets for manufacture, it was not long before I became interested in electric recording. Just when that interest crystallized I can not say without my notes, but in a brochure entitled "The History of Edison Bell" there is a picture of the recording studio in which there is clearly to be seen a swan neck horn Browns loudspeaker. I had it fixed there and was using it it as a "backwards" mike. The electrical people had put in a connecting (phone type) circuit to where my lab was at that time, and there I had a similar loudspeaker used in the right way. No amplification was needed, and while the speaker mike (perhaps the 120 ohm winding) may not have matched the connecting circuit, that was short and the mike certainly matched the output speaker. At one time I tried carbon mikes, but the amplitude distortion made me scrap the idea.

SB: How did you build and set up your first good microphone?

VOIGT: I had a portion of the wall between the studio and the lab removed and a shelf put across the opening. On that shelf I put a specially designed mike (description to follow) and hid the opening with thin silk or something. The mike had a square frame which however did not happen to fit the opening, so strips of carpet were fitted to close the space around the mike frame. The face of the mike was in the plane of the partition wall, simulating a closed window.

From what I learned from the excursion requirements, it was obvious that any velocity operated mike (moving iron or moving coil) had to be free to move about without any appreciable restraint. The ordinary arrangement of a diaphragm clamped around its edge was out.

The diaphragm of the special mike was spun of very thin aluminum and was the size and shape of a saucer. From its edge there were tangential spokes meeting at the hub on the convex side. The curved diaphragm

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was suspended in a circular hole in a square frame with about 1/8" clearance around its periphery. The main suspension was on two threads about 1 1/2" long spaced about 45° either side of the vertical center line. To stop it from flopping about there were two rubber threads pulling down, each at about 45° on either side of the lower part of the center line. There may have been cotton stuffed into the clearance between the diaphragm and the frame.

The transducer part consisted of a flat elongated coil mounted with its plane vertical and on an extrapolation of the diaphragm spin axis. Using magnets (at first it was permanent magnets out of a magneto, but later it was an electro-magnet) fitted with poles that provided a plane vertical air gap, the end of the coil was located within the pole piece jaws and free to move. Thus as the diaphragm vibrated, the coil vibrated, and that part of its coil within the magnetic field had a voltage induced in them. This arrangement was not efficient, but as a mike it was easier to put in some amplification than to devise a freely supported circular coil and magnet system.

SB: How did you become interested in loudspeakers?

Voigt: There was a great need for a good speaker to use in the studio. Musicians wasted much time in the recording studio because they could not tell from the gramophones in use at the time just how good or bad the recording was.

For laboratory test purposes, I wanted a perfect loudspeaker, or at least as close as possible. In 1924, on the 30th of April, when the B.B.C. was about 18 months old, Capt. P.P. Eckersley, an ex Marconi Engineer, and then chief Engineer of the B.B.C. gave the Radio Society of Great Britain a lecture on the early problems of the B.B.C. and how they coped with them. I had already considered what perfect (mono) sound should be like if ever we could produce it and in the discussion which followed the lecture was able to "ventilate" my "HOLE IN THE WALL" theory. The lecture (which took place in the I.E.E. lecture theatre) was reported in the Wireless World for 28th May, and the discussion in the W.W. for 4th June, 1924.

SB: Can you give a brief description of your hole in the wall theory?

Voigt: In those early days, I had done a mental preliminary survey, not of what bits and pieces should be put together to get good audio, but more fundamentally WHAT WOULD GOOD AUDIO BE LIKE IF WE EVER GOT IT.

My 1924 answer to that was my "hole in the wall theory. My hole-in-the-wall theory was controversial for a long time. Some people thought that perfect reproduction should sound as though the sould originated IN THE ROOM YOU WERE IN. That overlooks that your room has one set of reverberations and the studio or concert hall a totally different one. The latter can easily be made negligible by having the announcer come right up to his side of the wall where the hole is and, as it were, be talking direct to you through that hole. That theory and consequent understanding of what to aim for has been fundamental to my outlook. Incidentally a non-technical musical expert, visiting a friend who was having a demonstration in my corner horn days, wrote up his experience for some musical journal did not use the word "hole". He described his listening experience as listening through a WINDOW!

SB: What was the "state of the art" of gramophones and loudspeakers in the early '20's?

Voigt: When I asked leading gramophone designers what would the perfect sound reproduction sound like, I found that the "forward" tone was apparently the ideal.

Now having some scientific knowledge, I could not quite understand how a mechanical instrument could be expected to produce a tone which would appear to originate at some point 6 inches or so in front of the mouth of the horn, unless this effect were achieved by resonance or some form of forward reflection which would give a focal point there.

One of the firm's (Edison Bell) slogans at the time was "It rings out loud and clear", and so we have a clue to the ideas of perfect reproducti of the 1920's.[1]

In the 1920's loudspeakers for radio, etc. mostly began with an enlarged headphone mechanism coupled to a horn. The general idea had dev that the horn was the reason why the audio quality was so poor. I myself looked upon horns as an unknown quantity with the introduction of extra resonances into the system as a most probable disadvantage. (Editor's note: This attitude changed rather drastically later.)

With my "hole in the wall" concept in mind, it was obvious to me that for bass it was necessary to provide for the free oscillation of air volume through any such (real or imaginary) hole, and therefore the standard type of reproducer based upon the idea of a "blown up" earphone with trumpet attached would not meet the end requirements. Even the so-called hornless devices, with large diaphragms, were driven by some electromagnetic mechanism which, if adjustable and adjusted to be well clear of the pole pieces, would be inefficient and, if too close, would collapse onto the pole pieces. To prevent either occurrence, the diaphragms had to be stiff, i.e. no <u>freedom of movement</u>. Now I had seen a Magnavox with a 20" or so horn after World War I with a moving coil drive. But it sounded like the flat bottom of a white enammelled army mug of those days. I do not suppose for a moment that its diaphragm was made out of a myg, but that is what it sounded like and with an iron diaphragm clamped around its edge that is just about what you can expect.

SB: What was your normal approach to research?

Voigt: To get to grips with a problem and work out the answer is my normal way of trying to achieve progress. Having worked out the answer, it is my normal way to compare that answer with the ESTABLISHED ideas when such already exist. If my answer fits the established ideas, then what I have found is that I can safely use those ideas. IF, on the contrary, my result does not fit the established ones then, arises the question WHICH IS CORRECT or are BOTH WRONG.

Since I am rotten at maths, my approach is rarely the mathematical one. The usefulness of maths depends upon the accuracy of the ASSUMPTIONS on which that maths is based.

SB: How did you start designing moving coil loudspeakers?

Voigt: At Edison Bell I was experimenting with moving coil systems and using my knowledge, I designed the moving coil cutter for the recording system. I was familiar with the consequence of applying various field strengths (magnetic) to current carrying conductors.

One major result is that the greater the field strength, the greater is the electro-magnetic force for a given current. In those days, undistorted audio watts were expensive, that was one reason for pushing up the flux density. Another was that the greater the flux density, the greater was the electro-magnetic damping on the

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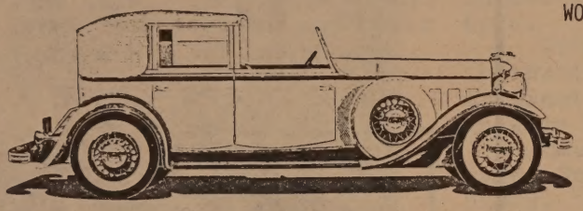

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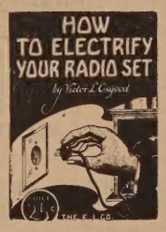

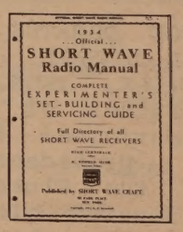
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moving coil (other things being unchanged). AND, there was a more subtle one, theoretical, but partly imaginary.

Suppose you could make the field strength so high that the electro-acoustic efficiency would average 100% over the whole audio scale, would it not have a flat energy response curve with no peaks or troughs?

While 100% efficiency is unattainable in practice, there was no question in my mind that the nearer you could get in that direction the better would be the ratio of average to peak. For example, if the average was 1/4 of 100%, i.e. 25%, any energy peak beyond 6 dB would provide the missing part for a perpetual motion machine!

The fact that in my lab, I had both d.c. and a.c. mains, meant that if I designed a huge magnet with electrical excitation, in those days when valve rectifiers were still unreliable, providing the excitation presented no difficulties.

(To be continued)

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THE INTERVIEWER

Dr. Bruce C. Edgar is a Space Scientist for The Aerospace Corporation and is interested in the history of loudspeakers.

on the air

FULTON LEWIS, JR.

off the record

BILL MONROE DONATES TREASURES TO THE HALL OF FAME

NASHVILLE, TENN. -- Bill Monroe, "Father of Bluegrass" who has performed for many-- including presidents-- and founder of the Bluegrass Boys, recently donated his favorite mandolins and a hat to the Country Music Foundation's Hall of Fame and Museum. A copy of his recent album on MCA Records was donated to the record collection of the Foundation's Library and Media Center.

Bill Monroe began his career in his native Kentucky at the early age of 13 playing with his Uncle Pen-- immortalized in Bill's most famous composition "Uncle Pen." Prior to this time he sang-- developing lung power without hindrance-- as he worked way out in the open fields of his family's farm. He also chose to develop his musical skills as opposed to usual childhood play activities.

From 1929-1934, Charlie, Birch and Bill Monroe worked manual jobs by day and played for dances and parties by night. A big break came in 1934 when radio WLS offered the trio fulltime employment. Charlie and Bill accepted the offer and formed the Monroe Brothers. In 1936, Eli Obertein of Victor Records persuaded the two to record. As a result "What Would You Give (In Exchange for Your Soul)" became an early best seller. In 1938, Bill and Charlie sought different career directions-- Bill's being to join the Opry. Bill's first Opry number was "Mule Skinner Blues." Other popular recordings of his are "Blue Moon of Kentucky." "Uncle Pen" and "Walking in Jerusalem." February 3, 1950, Bill signed with MCA Records and has recorded with them for the past thirty-one years.

The donations were prompted by the release of his new album, "Master of Bluegrass." The white beaver cowboy hat was given to Monroe in the 50s by Lester Flatt-- with whom he played in the early Opry days-- and depicts the lower crown of that era. (Monroe has always worn a hat.) The mandolin was a Gibson-- one of twelve that he owns-- given to him by a friend in Bristol, Virginia in the late 50s or early 60s. One morning Monroe was restlessly sleeping and arose around 2 a.m., tune this particular mandolin to C# minor-- where it has remained for 20-25 years-- and began to write "My Last Days On Earth," his current single from the MCA LP "Bill Monroe: Master of Bluegrass." Monroe says this mandolin lacks the deeper tones of his favorite mandolin, but he loves to play new sounds and create new songs on this one. The cover of the album includes a mandolin, case and white hat.

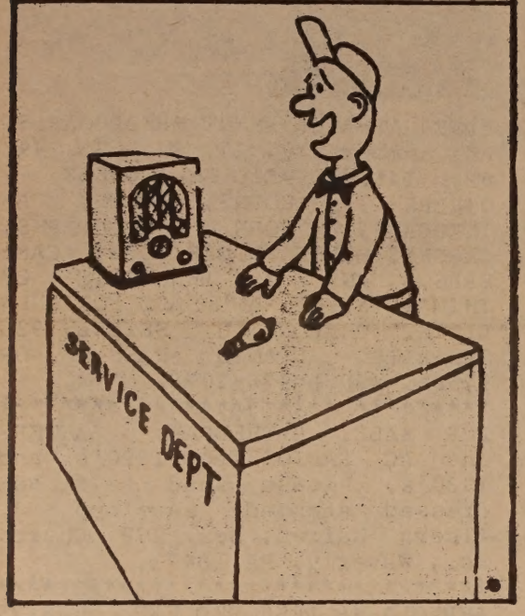
Accepting the donation for the museum were Charlie Seeman, curator of collections and Diana Johnson, deputy director of the Foundation. The album was accepted by Danny Hatcher, deputy director of the Foundation-- Library and Media Center. Also present were Chic Doherty, vice president of marketing for MCA Records; Jim

Fogelsong, president of MCA Records, Nashville; Hal Durham, manager of the Grand Ole Opry; Bud Wendell, president of WSM, Inc.; Tony Conway, vice president of Buddy Lee Attractions and other music executives.

The mandolin is displayed in the glass case by his Hall of Fame-- to which he was elected in 1970-- plaque.

The Country Music Foundation is a tax-exempt educational organization, and donations to its Hall of Fame and Museum or its Library and Media Center are tax deductible.

SHOP TALK



TUBE NUMBERING SYSTEM
by Fred Geer

In 1933 the RMA, Radio Manufactures Association, created a tube type numbering system for octal based metal and glass tubes. This system is used today on other based tubes as well as octals.

RMA used a number to indicate the approximate filament voltage of a tube. Example, 2A5 has a 2.5 volt filament.

Letters are used to distinguish one tube from another that has the same first number. Letters are assigned in alphabetical sequence, starting with the letter A except for rectifiers which start with the letter Z and work backward in alphabetical sequence.

Second letters are used to distinguish a tube with the same number and letter combination. Example, 6A7 and 6AB7.

Last number indicates the number of useful elements in the tube which are terminated in the tube base. Example, 2A5 has five useful elements; heater, cathode, two grids and a plate. The suppressor is connected to the cathode inside the tube and is not counted.

Metal tubes were first to use this system. Later glass versions of metal types were produced and the letter G was added after the last number to identify the tube as a glass type.

Often letters may follow indicating some change from the original tube such as a change in size and shape.

Caution. What has been said does not apply to all tubes.

Hint: Many collectors blow their breath on tubes to bring back faded numbers and letters, but it is suggested that you dip faded tube number in ammonia and let dry to make tube number stand out.

Fred Geer
Jacksonville, Florida

club news

POPULAR WEEKEND

The Antique Wireless Association is holding their 20th Annual Historical Conference, which is a four day event, that includes all the trimmings of many programs, auction, banquet, flea market, seminar and contest. The four days of the Conference, which will be held at the Sheraton Inn in Canandaiqua, New York, are October 21, 22, 23 and 24. It is reported, "Unlimited registration at door." Need more information? Contact: Dexter Deeley, 8 Briar Circle, Rochester, New York 14618.

On the same weekend but many miles apart Vintage Radio and Phonograph Society will hold their 6th Annual Convention, which includes a contest, usual sales, meetings and banquet. This is a three day Convention, which will be held at the Quality Inn in Irving Texas, now scheduled for October 23, 24 and 25, 1981. Want more information? Write: The Vintage Radio and Phonograph Association, P. O. Box 5345, Irving, Texas 75062.

letters

Dear Jim:

In reading my article on Zenith tuning belts in the May issue of THE HORN SPEAKER, I realized that there was an error in it. I stated that you should divide the distance around the pulleys by 3 to determine the size "O" ring you'll need. Instead of dividing by 3 you should divide by 3 1/4 (or multiply by .3). This will give you a snug fit, the number I gave in the article would make for a loose fit.

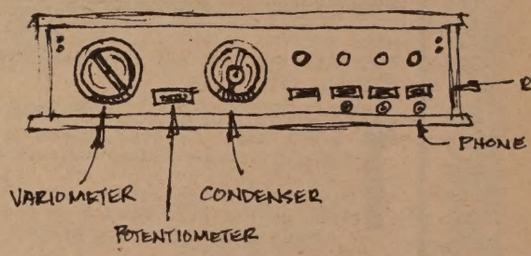
Ron Boucher
376 Cilley Road
Manchester, NH
03103

Dear Jim:

My set has only a variometer and a condenser (see sketch) and four tubes rather than a condenser, variocoupler and variometer with three tubes as pictured. I do not have the original cabinet or any information regarding the manufacturer of this set. I would truly appreciate if you could send me any information...

Thanks for your help.

Norman S. Braithwaite
1410 Norman Drive
Redding CA 96002



Dear Sir,

Can you please advise if my sub has run out to THE HORN SPEAKER. We find it quite interesting although we collect Australian old radios, etc.

We also collect gramophones, so information of these societies in the U.S. and Canada would be appreciated.

Regards
Allen Goodwin
L.S.A. Goodwin &Sons
Goodwins Rd. Bagdad
Sth-7407 Tasmania

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IRREPLACEABLE AUDIO TRANSFORMERS REWOUND at a 3 to 1 ratio unless otherwise requested. Regular, $10.00 each plus postage. Richard Ray, 423 Ochard, Canon City, CO 81212.

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FOR SALE: OLD RADIO BOOKS, next 4 sales list for a $1.00. RADIOGRAPHICS BOOKS, BOX 18492, Cleveland Heights, OH 44118.

****

FOR SALE: AUTHENTIC REPLICAS: FRONT PLATES FOR AK VARIO COUPLERS, VARIOMETERS, TYPE 11 TUNER, DIALS, KNOBS, POINTERS, BINDING POST NUTS, PUSH BUTTONS, BELT DRIVE PULLEYS FOR AK AND MUCH MORE. SASE FOR LISTINGS. K. PARRY, 17557 HORACE, GRANADA HILLS, CA 91344.

****

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****

TUBES, NEW and used for old radios. Most are $2 new, $1 used, plus shipping. I have octals, loctals, 4,5,6,7, pin, plus subminature types, also TV tubes. Send SASE for list- state your wants. Rick Weibezahl, 305 Belvidere Ave., Washington, NJ 07882.

****

WEBSTER MODEL 80-1 WIRE RECORDER, PORTABLE, GOOD CONDITION, WORKS. Extra reels and mike. Make offer. John Feuser, 41 Overlook Ave., Middletown, CT 06457. (203) 347-1447.

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NICKEL PLATED BRASS SWITCH POINTS. 1/4" HEAD DIAMETER, 5/8" LONG, 6-32 THREAD. HEAD THICKNESS 1/32" ; 1/8" ; 3/16". $15 PER HUNDRED, $8 PER 50, $5 PER 25. BOB, W6ME, 4178 CHASIN STREET, OCEANSIDE, CA, 92054.

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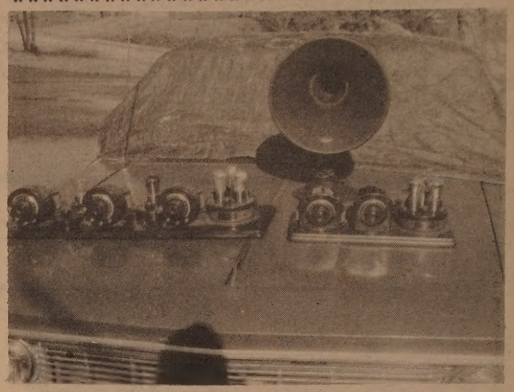

FIVE ATWATER KENT BREADBOARDS. AKs nnmbers 20, 21, 33, 35, 49, 82, 145. RADIOLAS. GREBE -- OTHERS ... HORNS, TUBES, CATHEDRALS, HORN PHONOGRAPHS, CLOCKS, MOVIE PROJECTORS, CAMERAS, AND A MENAGERIE OF THINGS. $1.00 AND SASE FOR NEW LISTS. CHARLES H. SEIDEL, 925 STARLITE, GRANTS PASS, OR 97526. (503) 476-1078.

****

FOR SALE: CATHEDRAL, BATTERY and AC RADIOS from 1920's and 1930's. Please send self addressed stamped envelope. J. Albert Warren, Box 279, Church St., Waverly, PA 18471.

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AERIOLA SR RESTORED EXC	$125
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RADIOLA 20 RESTORED EXC	$120
CROSLEY 52 RESTORED EXC	$80
CROSLEY 5150 ATTRAC. TABLE MODEL AIRPLANE DIAL WORKS	$55
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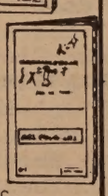

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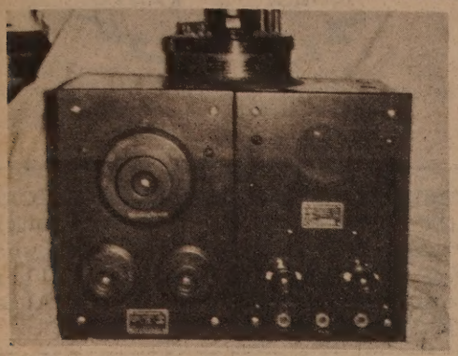

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AK TA-1 One tube audio amp. in above picture, on top. very rare, clean, AF xfmr. OK, .. $150.00. Will take AK BB parts in part trade. 2 - WD12's brass base, glass tip, test OK .. $25.00 each. Both .. $45.00. One Magnavox R3 spkr unit, less horn, works OK .. $55.00. R.C.A. 1325 horn and unit, fair .. $25.00. Sam's Photo Facts, bound, 9 vols., 61-150, C $10.00 ea. Philco 7 tube, 42-345 ..$40.00 Zenith 6S330, PB missing .. $45.00 Zenith Transoceanic L-600, works good ..$45.00 R.C.A. 6-tube T64AC .. $45.00. Lots of 1-50 volt tubes, new in boxes. Send SASE for list. WM key, 625 Whitman St., R.F.D., Hanson, MA 02341. Tel. (617) 447-2311
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****

NEW, ORIGINAL CARTONED OCTALS, LOCTALS, MINIATURES, TV TUBES FOR SALE. This is a nc nonsense offer... nc used substitutes will be made. Terms $2.75 each. Each lot of 10 tubes discounted to $24.00. Include 75 cents for every 5 tubes. Sorry, no list. Send SASE for specific availability. Thirty day offer. Maury Zivitz; 11503 Atwell Dr.; Houston, TX 77035; (713) 723-4254.
****

TV TRADE: Duplicate Western Television/ Orpheous Scanner for different Scanner. Bill Russell, 6463 1/2 Fulton Ave., Van Nuys, CA 91401. (213) 989-4086.
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SELL 10 SIGNAL CORPS. RADIO MANUALS; SCR-54/54A, SCR-67/-67A, SCR-69, SCR-74/74A, SCR-79A/99, SCR-105, SCR-109A-/159, SCR-127/130, Wavemeters and Decremeters (phamphlet #28). Amplifiers and Heterodynes (Phamplet #9). $150 for the lot. W6ME, 4178 Chasin Street, Oceanside, CA 92054
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"SUPREME Most-Often-Needed RADIO DIAGRAM MANUALS discounted to 60%. Also TV service manuals. Free information. SASE. Supreme, 1760 Balsam, Highland Park, IL 60035."
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RIDER TV I $22; RCA SERVICE DATA, Vol. I $24; Official Radio Service Manual, Vol. I $23; Most-Often-Needed 1926-38 Radio Diagrams (clean, original) $12; Ghirardi's Radio Trouble-Shooter's Handbook $15; Assorted RIDERS $8 to $17. Include postage. Maury Zivitz, Ph.D; 11503 Atwell Dr.; Houston, TX 77035; (713) 723-4254.
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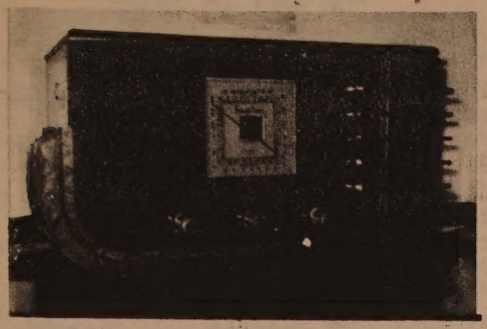
Wanted



PLEASE HELP. I LOVE MIRRORED GLASS RADIOS. IF YOU HAVE ONE OR KNOW WHERE THERE IS ONE, PLEASE LET ME KNOW. I'M ALSO INTERESTED IN ANY "WILD LOOKING" RADIOS FROM THE 1930'S LIKE COLORED CELLULOID RADIOS (FADA, EMERSON, ETC.) AND CHROME RADIOS. BARBARA GORTON, BOX 1252, DAYTON, OH 45401. (513) 253-5073.

WANTED: GRANDFATHER CLOCK RADIOS AND MIRRORED GLASS RADIOS (ESPECIALLY SPARTON). ALSO INTERESTED IN ACQUIRING A ZENITH STRATOSPHERE MODEL NO. 2501 PC. MAY SWAP DUPLICATE CROSLEY OR PHILCO GRANDFATHER CLOCK RADIO FOR WHAT HAVE YOU. ALL LETTERS ANSWERED. ED SAGE, 1781 HELANE COURT, BENICA, CALIFORNIA 94510. (707) 746-5659.

CASH -- FOR RADIO RETAILING MAGAZINES, Radio Today, Radio T.V. Retailing, 1925 to 1955, for personal collection. Send your list and prices first letter. Also want Detrola Radio Corp. Advertising, yearly set phamphlets, factory literature, dealer signs, etc. Please no Rider or Supreme info. Or contact me and I will send you my want list. EDWARD BZOVY, 140 North Citrus Ave., Covina, CA 91723.

WANTED "ELECTRIC CLOCK" for Philco Grandfather clock/radio model 570, Bob Westrick, 702 Broadmoor Dr., Annapolis, MD 21401. Call collect (301) 757-5661.

WANTED: EARLY CEILING OR TABLE FANS. ESPECIALLY ODD OR UNUSUAL TYPES. RICHARD CANE, 8391 N.W. 21st ST., SUNRISE, FL 33322.

WANTED: SCOTT radio in Napier console (radio in open on top of console), Scott FM tuner, Scott FM converter, Scott Communications receiver, original Scott literature, Zenith Stratosphere 25 tube receiver. Steve Chapman, 419 Bird Lane, Waxahachie, TX 75165. (214) 937-2726 (home).

Wanted

CASH FOR DECEMBER 1915 TO DECEMBER 1921 QST'S FOR PERSONAL COLLECTION. KEN MILLER, K6IR; 16904 GEORGE WASHINGTON; ROCKVILLE, MARYLAND 20853. (301) 774-7709.

WANTED: SCOTT PHILHARMONIC. Prefer Napier console. Dick Howe, 9318 Wickford, Houston, TX 77024 or call (713) 680-9945 collect.

GLASS CASED RADIO (no home brews) have Federal 110, Kennedy V and other fine sets as trade items. Send S.A.S.E. to Leonard Prince, 25 Merrymeeting Drive, Topsham, MA 04086.

HOOK-UP AND DETAILS OF "PHASATROL" as used in Browning Drake set--- Radio News, 1927 April, page 1273. Also hook-up and any available information on a Fada 195A small neutrodyne set. Need 6 UV99 sockets alike. J. N. CLAPP, 1202 W 5, DE WITT, IA 52742.

MICROPHONES for broadcast archive. Early carbon, dynamic, condenser or ribbon types. Purchase or trade. James Steele, National Association of Broadcasters, 477 Madison Avenue, New York, NY 10022.

WANTED: AN IP-501 OR NAVY SE*1420. PLEASE GIVE CONDITION AND BEST PRICE. BOB W6ME, 4178 CHASIN STREET, OCEANSIDE, CA 92054.

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WANTED: INDIVIDUAL RADIO REPAIR AND SERVICE MANUALS FROM 1930 TO 1950 FOR G.E., PHILCO, ZENITH, AIRLINE, CROSLEY, SILVERTONE, STEWART WARNER, EMERSON, AND R.C.A. INTERESTED IN ANY QUANITY. SEND PRICES. CHARLES TEAGUE, 330 SEMINOLE, BOULDER, CO 80303

WANTED: WESTERN ELECTRIC catalogs and technical manuals on 1946-1981 telephones and accessories such as plugs and jacks. Also need WE plugs and jacks for residential use. Carleton Sarver, 256 West 88th Street, New York, NY 10024.

Wanted

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PHILCO MODEL 18 OR 118 chassis, speaker and knobs or whole things. Will buy other cathedrals. State condition and price. Joe Beach, 6515 SUNSET, GARDEN CITY, MI 48135. (313) 261-7965.

HI-FI, TAPE, AUDIO, and retail magazines and brochures: 1945-55 only; Precedent FM tuner; early 1950's transistor sets. H. Layer, AV-SFSU, 1600 Holloway, San Francisco, CA 94132.

SERIOUS NEW COLLECTOR HAS LITTLE TO TRADE, WISHES TO PURCHASE: 1.) RIDERS MANUALS, INDEXES 2.) NEW TUBES IN BOXES; 24A, 26, 27, 45, 47, 71A, 2A6, 2A7. 3.) 30'S RADIO RETAILING MAGAZINES, CATALOGS, ETC. 4.) PRE 1937 A.C. WOOD CASE TABLE RADIOS; WANT MINT OR EXCELLENT CABINETS, WORKING OR NOT, MOST INTERESTED IN A.K., G.E., PHILCO, AND R.C.A. VINNY SHEA, 6 ROCKY RIDGE RD., EASTON, CT 06612.

ESCUTCHEON PLATE FOR CLARION JR., AC-60, Knobs for Grigsby-Grunow Majestic (model 70). Fireside Wireless, 1507 Ridge Ave., New Castle, PA 16101 (412) 654-9335.

WANTED: BREADBOARDS -- 4 TUBES OR LESS. ANYTHING PRE 1922. WHAT HAVE YOU GOT?? POSTAGE REFUNDED. RAY GARNER, RT. 10, BOX 645M-1, FT. WORTH, TX 76135.

List ads - 35 cents per line

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* SPECIAL -- NEW MERIT POWER TRANSFORMERS, 300-0-300 V AC AT 90MA, 5V AT 3A, 6.3V AT 3.5A, $15.00 EA. OR 2/$25.00.
* OLDE TYME TEST EQUIPMENT - WRITE US.
* INTERSTAGE AUDIOS -- STANCOR A53C .. $7.00 EA (NEW). MIL SPEC 2:1, GOOD FOR RADIOLA III - IIIA - BALANCED AMPLIFIER (USED) .. $2.50 EA.
* AUTO VIBRATORS -- NEW 4-PRONG 6V, 4-PRONG 12V, 3-PRONG 12V AT LOW PRICE OF $5.00 EA. USED UNITS AT $2.50 EA.
* EXACT REPLACEMENT RADIOLA II OR VIII LEATHER HANDLES .. ONLY $4.50 EA.
* SCHEMATICS FOR SETS MANUFACTURE FROM 1920 THRU 1940 .. $1.50 EA.
* OLDE TYME BAKELITE BINDING POSTS - SINGLES .50 EA., 3/$1.00; TRIPLES $1.00 EA., 3/$2.50.
* RESISTOR LINE CORD REPLACEMENT KITS: 4-TUBE .. $3.50, 5-TUBE .. 4.50.
* TUBES FROM THE 20'S, 30'S, 40'S AND 50'S. MOST TYPES. BOTH USED AND UNUSED. ALL TUBES GUARANTEED- 30 DAYS. (USED- UNUSED) WRITE FOR A QUOTE.
* OLDE TYME RADIO BATTERY CABLE - 5 CONDUCTOR, ALL CLOTH, AK STYLE .. .75/FT. - 6 CONDUCTOR, ALL CLOTH, AK STYLE .. $1.00/FT., - BROWN SILK TYPE POWER CORD .. .30/FT. - SINGLE CONDUCTOR HOOKUP WIRE (CLOTH) .. .12/FT.
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VINTAGE RADIO & PHONOGRAPH SOCIETY

CONVENTION AND AUCTION

OCTOBER 23-25, 1981

QUALITY INN, 215 CARPENTER FWY, IRVING

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PUBLISHERS OF P.O. BOX 28572 DALLAS TEXAS 75228

ANTIQUE RADIO TOPICS & THE CLASSIC RADIO NEWSLETTER

LIST N/19

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0A3	$3	1H5	$6	2A5	$7	6A6	$5	6B7	$7	6K5	$5	6SS7	$5	7B6	$6	12AT6	$4	12SQ7	$5	25A7	$6	37	$6	70A7	$7	1203	$6
0A4	$5	1H6	$6	2A6	$7	6A7	$9	6B8	$7	6K6	$5	6ST7	$5	7B7	$7	12AT7	$4	12SR7	$5	25A6S	$6	38	$6	70L7	$8	1231	$6
0B3	$4	1J5	$6	2A7	$8	6A8	$8	6BA6	$8	6K7	$6	6SU7	$5	7B8	$6	12AU6	$3	12SW7	$5	25B6	$8	39	$6	71A	$9	1232	$7
0C3	$4	1J6	$6	2B7	$6	6AB4	$4	6BE6	$4	6K8	$6	6SV7	$5	7C5	$5	12AU7	$5	12V6	$4	25C6	$6	40	$9	75	$8	1273	$6
0D3	$4	1L4	$6	2E5	$10	6AB5	$12	6B7G	$4	6L5	$6	6SZ7	$5	7C6	$8	12AV6	$4	1223	$4	25L6	$6	40Z5	$5	76	$5	1274	$6
0V4	$4	1L6	$12	2W3	$4	6AB7	$6	6C8	$4	6L6	$5	6T7	$6	7C7	$6	12AX7	$4	14A4	$6	25S	$6	41	$6	77	$7	1282	$6
0Z4	$5	1LA4	$7	2X2	$5	6AC5	$4	6C9	$4	6L7	$6	6T8	$3	7E6	$6	12AY7	$4	14A5	$6	25Z5	$6	42	$6	78	$8	1291	$6
1A3	$6	1LA6	$6	3A4	$5	6AC7	$6	6C6	$7	6N5	$12	6Q5	$12	7E7	$6	12B7	$6	14A7	$6	2526	$6	43	$7	79	$6	1294	$6
1A4	$6	1LB4	$7	3A5	$5	6AD5	$7	6C7	$7	6N6	$6	6U6	$4	7F7	$12	12B8	$6	14AF7	$6	26	$7	44	$6	80	$5	1629	$9
1A5	$5	1LC5	$6	3A8	$6	6AD6	$9	6C8	$6	6N7	$6	6U7	$7	7F8	$9	12BA6	$4	14B5	$6	26A6	$6	45	$10	81	$9	1652	$6
1A6	$5	1LC6	$6	3B5	$5	6AD7	$6	6CB6	$3	6P5	$5	6V6	$3	7G7	$7	12BE6	$4	14B6	$6	26A7	$6	4523	$3	82	$7	1653	$6
1A7	$4	1LD5	$6	3B7	$5	6AE5	$5	6D8	$5	6P7	$6	6V7	$5	7H7	$6	12C5	$5	1488	$6	27	$7	4525	$4	83	$7	5881	$7
1B4	$4	1LE3	$6	5C6	$6	6AE6	$6	6D6	$7	6Q7	$6	6W6	$4	7J7	$7	12C8	$6	14C5	$5	28D7	$4	46	$6	83V	$7	6146	$7
1B5	$6	1LE3	$6	5EF6	$6	6AE7	$6	6D7	$7	6R7	$6	6X4	$8	7K7	$7	12E1	$5	14C7	$6	30	$7	47	$6	84	$6	9001	$5
1B7	$6	1LG5	$6	5U4	$5	6AF5	$6	6DE7	$7	6S4	$5	6X5	$4	7L7	$7	12H6	$6	14E6	$6	31	$6	48	$8	85	$6	9002	$5
1C5	$4	1LH4	$6	5Y3	$5	6AF6	$9	6E5	$12	6S7	$6	6V6	$5	7N7	$10	12J5	$6	14E7	$6	32	$6	49	$6	89	$6	9003	$5
1C6	$5	1LN5	$6	5Y4	$4	6AG5	$4	6E6	$5	6S8	$7	6Z4	$6	7Q7	$6	12J7	$5	14F7	$7	32L6	$4	50	$9	117L7	$9	9006	$6
1C7	$6	1N5	$6	5V4	$5	6AG7	$5	6E7	$7	6SA7	$5	6Z5	$6	7R7	$6	12K7	$6	14F8	$6	32L7	$6	50A5	$6	117M7	$9	VR75	$4
1D5	$6	1N6	$6	5AZ4	$8	6AH5	$15	6E8	$7	6SB7	$6	6Z7	$6	7S7	$7	12K8	$6	14H7	$6	33	$6	50B5	$4	117N7	$8	VR90	$4
1D7	$6	1P5	$5	5R4	$5	6AH7	$5	6F5	$6	6SC7	$6	6ZY5	$6	7V7	$6	12L6	$4	1437	$7	34	$6	50C5	$5	117P7	$8	VR105	$4
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1E4	$5	1R4	$6	5U4	$4	6AL5	$4	6F7	$7	6SE7	$5	7A5	$5	7X6	$7	12SA7	$5	1407	$6	35A5	$6	50L6	$5	117Z4	$6	VT-50	$7
1E5	$6	1R5	$3	5V4	$5	6AL7	$9	6F8	$5	6SF5	$5	7A6	$6	7X7	$7	12SB7	$6	14R7	$6	35B5	$5	50X6	$6	117Z6	$6	FM1000	$9
1E7	$6	1S4	$4	5U4	$5	6AQ5	$4	5G5	$12	6SF7	$5	7A7	$6	7Y4	$6	12SC7	$6	14W7	$6	35C5	$4	5096	$6	485	$7	XXB	$6
1F4	$6	1S5	$4	5X4	$5	6AQ7	$3	6G6	$5	6SG7	$6	7A8	$6	12SF5	$5	14X7	$7	35L6	$5	5097	$6	717A	$9	X50	$8	XXD	$6
1F5	$6	1T4	$5	5Y3	$4	6AT6	$4	6H4	$5	6SH7	$5	7AD7	$6	10	$9	12SF7	$5	35	$9	35W4	$5	51	$7	879	$5	XXL	$6
1F6	$6	1T5	$5	5V4	$5	6AT8	$8	6H6	$3	6SJ7	$5	7AE7	$6	11	$8	12SG7	$6	39	$7	35Y4	$6	53	$15	884	$8	XXFM	$7
1F7	$6	1U4	$5	5Z3	$5	6AU6	$3	6J4	$5	6SK7	$5	7AF7	$6	12A5	$6	12SH7	$6	39T8	$3	5528	$6	55	$6	950	$6		
1G4	$6	1U5	$5	5Z4	$5	6AV6	$4	6J5	$6	6SL7	$5	7AG7	$8	12A6	$6	12ST7	$5	50	$9	5534	$6	56	$6	951	$8		
1G5	$6	1V	$6	6A5	$6	6B4	$6	6J6	$3	6SN7	$3	7AH7	$6	12A7	$7	12SK7	$5	5Z	$8	5535	$5	57	$7	955	$7		
1G6	$6	2A3	$10	6A8	$7	6B5	$7	6J7	$6	6SQ7	$5	7B4	$6	12A8	$6	12SL7	$5	24A	$7	5936	$6	58	$6	958	$7		

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